GEOGRAPHIC SCHOOL BULLETINS

THE NATIONAL GEOGRAPHIC SOCIETY, WASHINGTON 6, D.C.

APRIL 25, 1960, VOLUME 38, NUMBER 27 . . . *To Know This World, Its Life*

NATIONAL GEOGRAPHIC PHOTOGRAPHER B. ANTHONY STEWART

PRIDE OF THE NORTHWEST—Washington's Palouse Hills roll under golden sea of wheat

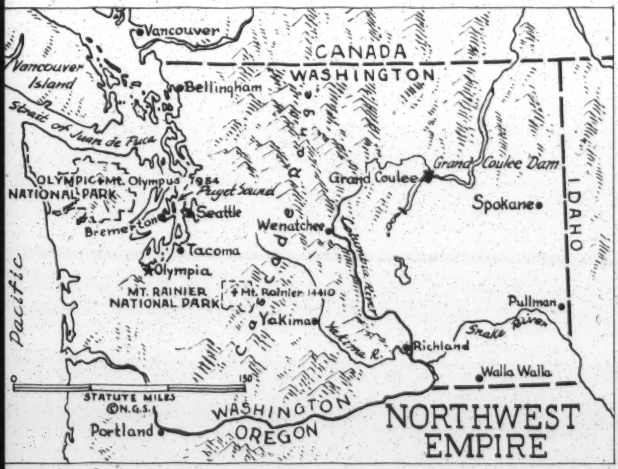
WASHINGTON STATE

also — ► Slime Molds ► Vanishing Beaches

► *Geographic* Editor Meets Asia's Children 313

UMI

is a nonprofit educational and scientific society established for the increase and diffusion of geographic knowledge.



©NGS

atmosphere; and the Minuteman, a solid-fuel ICBM that will span 6,300 miles in half an hour. Jetliners, that shrink the 3,000 miles between our East and West Coasts to less than a six-hour ride, roll along assembly lines. All are products of the giant Boeing Airplane Company which spreads over 3,000 acres in Seattle and near-by Renton.

Seattle is also the home of the University of Washington, largest in the Northwest, and the mills and markets for the lumber from the vast forests of the Cascade Mountains.

Mountains wall the city, as they wall Olympia, capital of the State, and Tacoma, with its 47 square miles of homes, smelters, grain elevators, and parklands. Farther east, the natural majesty of the Cascade wilderness enhances man-made wonders like Grand Coulee Dam, harnessing the mighty Columbia River for industry and spreading its water to irrigate the State's central million-acre fruit, vegetable, and grain garden.

BOB AND IRA SPRING

Washington is the smallest of the western States. But the comparison is deceiving, for its 68,192 square miles would cover all the New England States put together and then some. Its mountains, rivers, trees, and spirit are scaled to the same size: big.

The Cascade Range splits the State in two (see map above). West of the mountains are areas drenched by the heaviest rainfall in the continental United States. East of them, some parts are so dry "they say the jack rabbits have to pack canteens," writes Merle Severy in the April, 1960, *National Geographic.*

Other features mirror the extremes of climate. Soil ranges from the rich black loam of the western

UMI

Wonder-filled Washington State

JUST AS MOUNT RAINIER forms a backdrop for the sleek towers of downtown Seattle, so the rough and ready Northwest of Lewis and Clark underpins 20th century Washington's cities, dams, and missile plants.

For 150 years man has left his heavy handprints on the Northwest. Still, parts of Washington remain untouched. Glaciers whiten sky-probing peaks. Areas of the Olympic Mountains are still unexplored. Millions of acres of timber have never been logged. Scab rock and sagebrush surround the atomic energy works at Hanford. Seven minutes from the bustling business section of Seattle, beavers breakfast on willow tree sprouts and wild ducks trot on lakeside lawns.

But the same waters also provide Seattle with 193 miles of waterfront, making it a leading Northwest seaport, a gateway to the Orient, and capital of the salmon industry. The Alaskan salmon fleet calls Seattle home base, and much of the catch is canned and marketed here. Not all the boats that line the docks are commercial. A parade of pleasure boats, below, gay with pennants, enters Lake Washington to launch Seattle's sailing season. Seattleites go calling in boats. Lake people commute to work by water.

They build Bomarc missiles, right, defense against enemy aircraft 400 miles away; Dyna-Soars, manned vehicles that will operate in and out of the

Photographs by National Geographic Photographer B. Anthony Stewart

GEOGRAPHIC SCHOOL BULLETINS Copyright © 1960 by the National Geographic Society, Melville Bell Grosvenor, President. Published each week during school months by the School Service Division, Ralph Gray, Chief. Assistants: Arthur P. Miller, Jr., Frank Sartwell, Katherine Crapster, Liva Baker. Entered as second class matter, Washington, D.C. International copyright. All rights reserved. Rates: United States, $2.00 for 30 issues (one school year); Canada, $2.25; elsewhere, $2.50. U. S. only, 3 years (90 issues), $5.00. The National Geographic Society is a nonprofit educational and scientific society established for the increase and diffusion of geographic knowledge.

ing Canada, to the tune of "Fifty-four

salmon is the prize catch.

For more than 100 years lumbering has been one of the State's biggest sources of income. A good deal of the lumberman's work is not cutting down, but building up. The women at left weed a bed of baby Douglas firs. If natural seeding fails on cutover land, tree farmers plant these.

Where once a good part of the tree went up in smoke in a mill's burner, now one department's waste is another's raw material. Shavings become fiberboard or fireplace logs. Sander dust goes into linoleum. Bark goes into plywood, plastics, soil conditioners, and insecticides. Pulp wastes become alcohol and artificial vanilla.

Not only booming business chains people to the Northwest. Orchards green the Yakima, Wenatchee, Columbia, and Okanogan river valleys.

The leading apple State, Washington grows one-quarter of the Nation's crop. Apples below ripen at Washington State University's Tree Fruit Experiment Station, Wenatchee.

Nor does central Washington put all its fruit in one basket. Yakima County leads the Nation in cherries, pears, and hops; ships huge quantities of peaches, plums, and apricots. Its rangelands and feed pens are full of Hereford and black Angus steers.

Bumper wheat crops spike the hills of eastern Washington. Yield—more than 35 bushels an acre—is the Nation's highest.

In the middle of this inland bowl of plenty lies Spokane, processing and shipping the region's produce.

Frontiers remain to be crossed. On the University of Washington campus in Seattle, scientists experiment with salmon, learning their breeding habits. They hope one day to establish artificial spawning grounds in streams where dams won't interfere with the salmon's spawning.

In addition to making plutonium for the Nation's defense today, the atomic energy works at Hanford develops peaceful atomic uses for tomorrow. L.B.

UMI

river valleys to the stony dust of the arid inlands.

Height varies from Mount Rainier at 14,410 feet to depressions in the Columbia and Snake River basins which approach sea level.

For the white man, the State's story begins with Sir Francis Drake's 16th century trip around the world and his vain search for the fabled Northwest Passage to the Orient. Two hundred years later Spaniards and Englishmen put in to shore, and the scramble for the sleek sea otter's fur was on. But Spain was edged out, and the Indians sold their pelts to the English and Americans. The trade was profitable: Yankees swapped cheap peddler's wares for the rich furs.

Lewis and Clark called attention to the Northwest when their early 19th century crossing of the continent touched the southeast corner of what was to become Washington and followed its southern boundary (the Columbia River) to the Pacific Ocean.

More fur traders and explorers, little bands of missionaries and settlers followed. Prairie wagons rumbled over the Oregon Trail.

A boundary dispute with neighboring Canada, to the tune of "Fifty-four forty or fight," was settled in 1846 without either. The border was placed at 49° North Latitude.

Washington was even more firmly tied to the States when a transcontinental railroad striped the nation, ending in Tacoma. In 1889, Washington won statehood. Four years later the Great Northern Railway sliced through the Cascades to Everett and Seattle, touching off a boom that became a stampede when Klondike gold poured in. Then Washington's wealth of tall timber dangled before eastern eyes, and another stampede was on.

The migration slowed, but never stopped. Defense plant work during World War II lured another influx.

Not the least of the State's lures is its reputation as a vacationer's paradise. Campers flock to Washington's 55 State parks, two national parks, and eight national forests. Trail riders above explore Mount Rainier's snow-blanketed slopes. Skiers glide down near-by mountains all summer.

Lakes spot the State, and hatcheries stock their waters with as many as 50 million fish a year. Near Coulee City, anglers took 90,385 trout from one lake one opening day. Along the coast, salmon is the prize catch.

Turn Into Animals

You can find them on rotting wood or dead leaves—intricate, colorful little bodies less than a quarter of an inch high. These are the spore-producing stages of the slime molds.

As these paintings, greatly enlarged, show, each species is distinctive. Some wave dangling baskets (left), or resemble layered cups (right), or toadstools (lower right). There are many other forms as well.

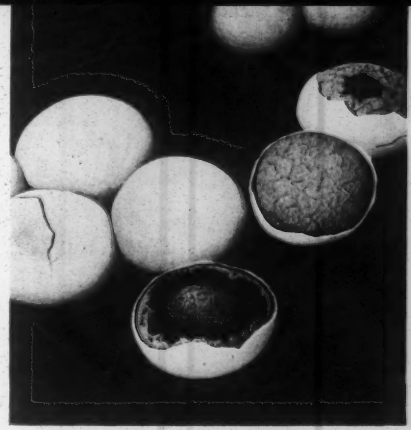
If the microscopic spores, carried by the wind, fall in a suitable spot, their contents swell, shuck off the outer shell, and go swimming along, for all the world like a one-celled animal. They may even grow tails to help them swim.

These cells multiply by dividing—they split in two, like the amoeba. When large numbers come into contact, they can merge into a single "animal." This stage, called the plasmodium (left), travels about seeking food—chiefly bacteria. Often it is found like a pattern of veins spreading through a dead tree. When the time comes, it can ooze out of the tree, and wander about seeking proper conditions for "flowering."

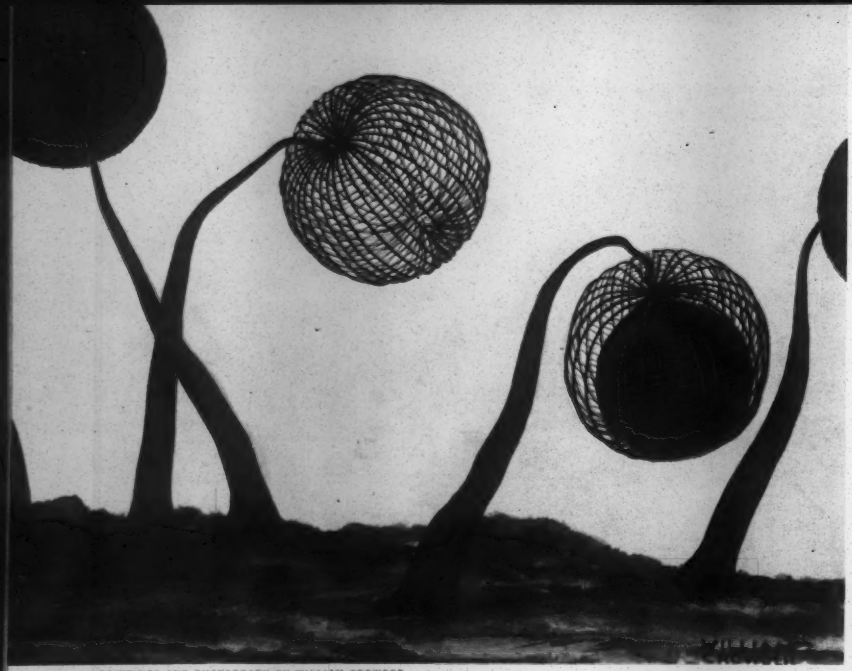
Brought into the laboratory, a plasmodium will obligingly spread out over a wet glass plate for microscopic study. Since it seems to be pure protoplasm, scientists use it for experiments on this basic living material.

In nature, it often flows upward, toward a place where its spores will catch the wind readily. Then the plasmodium dries up and separates into little patches. From them grows a miniature forest of spore-bodies, ready to begin the cycle again.

F.S.



EGGS AND TOADSTOOLS—The 300 species of slime molds in the United States show a wide variety of shapes and colors. The *Diderma* cups at left are a delicate pink when young, later fade to white. *Diachea*, below, raises iridescent purple heads on white stems.



PAINTINGS AND PHOTOGRAPH BY WILLIAM CROWDER

TINY JEWELS—The widely distributed *Dictydium* slime mold holds aloft brown or purple baskets. Spores at first fill the containers (left). Then, as the wind jostles them, the baskets shake out their contents like pepper boxes.

THE OOZING HUNTER of the woodpile—light-colored and laced with veins, the plasmodium of a slime mold moves slowly about in search of food and moisture. Odorless and tasteless, it has the consistency of egg white. Color varies from white through brown, red, violet, or green. Months or years may pass before it fruits.

Plants That

CAN YOU TELL a plant from an animal? Don't be too sure. What would you say of an organism that turns from one into the other . . . or seems to?

What would you say of the common, often beautiful slime molds, that move about hunting their food, then turn themselves into what appear to be tiny mushrooms, and reproduce by seedlike spores?

Well, if you follow the lead of the experts, you might conclude that the question is unanswerable. Apparently half plant and half animal, the slime molds are in a class by themselves, called Mycetozoa.

Virginia side, so Virginia recedes as Maryland creeps forward.

Loss of beaches is not peculiar to the East Coast. The sea has virtually reclaimed Oregon's Bayocean Peninsula. Point Barrow, Alaska, the Nation's northernmost soil, is shrinking southward. Studies are being made of the disappearance of beaches, farm acres, and marshlands on the Great Lakes.

The struggle to save the beaches has one vastly discouraging aspect: Erosion is normal. Since the formation of oceans and lakes in early geological eras, shorelines have changed constantly. Where beaches remain more or less the same, there is an unusual balance between nature's give and take of sand.

Tactics used to fight the waves include building sea walls, dredging inlets, erecting groins, breakwaters, and jetties. In many places the best way to keep the beach from disappearing is to simply dump more sand on it. Jones Beach is an example of a man-developed strand.

The other wave, people, cannot be countered so easily. Postwar prosperity and rising population mean that there are many more persons with the time and money to vacation by the sea. As the people increase, the available shoreline dwindles. The National Park Service has found that on the 3,700 mile Atlantic and Gulf coasts, only 240 miles are in public ownership for recreational purposes. Of the 1,700 miles of Pacific coast, only 295 miles are available for public recreation. (This includes the strand of Olympic National Park below, where a family can enjoy a quiet picnic alone.)

Another claimant of a place on the beach is industry. The dunes of Indiana, coveted for a park, are owned by steel companies that intend to build mills beside Lake Michigan.

The Park Service, with the support of the Shore and Beach Preservation Association (Washington, D. C.), is trying to have more beach areas set aside as national shorelines, similar to the national parks.

These include the Indiana dunes, the greater outer beach of Cape Cod, the dunes and sea lion caves of southern Oregon, Padre Island off Texas, and Point Reyes, California.

The first national shoreline has been established at Cape Hatteras, on North Carolina's Outer Banks. F.S.

PAUL A. ZAHL, NATIONAL GEOGRAPHIC STAFF

UMI

The Fight to Save the Beaches

NATIONAL GEOGRAPHIC PHOTOGRAPHER BATES LITTLEHALES

FROM THE UMBRELLA-dotted sand of Jones Beach, New York, (above) to the wild shores of Olympic National Park, Washington (below), the Nation's beaches are under attack.

Constantly battering waves—both water and people—are wearing them down and covering them up. To the water we lose about a foot of beach a year along all coasts, experts estimate. To the people we are rapidly losing our few remaining wild beach areas.

In the forefront of the fight to conserve our beaches is the American Shore and Beach Preservation Association, meeting this week in Pacific Palisades, California. Founded in 1926, the association was instrumental in the establishment of the Beach Erosion Board in the Army Corps of Engineers. The board studies the causes and possible cures of erosion. More recently, Congress has authorized Federal payment of up to one-third of the cost of beach protection undertaken by States and communities.

Members know that the sea is gobbling up gold, in effect, at resorts where ocean front property is worth millions of dollars a mile. The menace to this form of seashore wealth is particularly acute on the coasts of New Jersey, Long Island, Massachusetts, Florida, and southern California, according to the Beach Erosion Board.

Cape May, the popular resort at New Jersey's southern tip, has lost hundreds of feet of seafront in places. Fish swim where houses stood and gardens bloomed. Some dwellings have been moved inland three times. Unless the erosion is stopped, town officials say, the present site of Cape May will lie under salt water in another 25 years.

Fire Island, the long sand spit that protects the southern shore of Long Island, fights a constant battle against the encroachment of the Atlantic. In an effort to build up wind-resistant barriers of sand, the islanders have "seeded" the eroding dunes with everything from junked automobiles to sacks of empty tin cans.

Virginia has a unique problem related to the erosion of its Potomac banks. Maryland owns the Potomac River to the low-water mark on the

CRICKET IN INDIA is a joyful carry-over from British days. Beneath Delhi's soaring Qutb Minar, these Indian boys practice the good sportsmanship of "the playing fields of Eton."

The fluted tower, built of sandstone and marble, rises 238 feet. It was finished in the 13th century to commemorate the Islam conquest. From its top a muezzin used to call the faithful to prayer.

JUST AS AMERICAN school groups troop to Washington, Thailand youngsters visit their country's national shrines in Bangkok. They leave the gateway to the Royal Temple and, carrying incense and flowers, mount the steps of the Royal Pantheon.

UMI

Editor Meets the Children of Asia

Photographs by Melville Bell Grosvenor

ON A RECENT TRIP around the world, Melville Bell Grosvenor, Editor of the *National Geographic*, took time out from a busy schedule of reconnaissance for the Magazine to make acquaintance with Asia's beguiling children. Training his cameras on the smiling faces of friendly youngsters, he showed once again that a hope for a better tomorrow exists in the universal tolerance and good fellowship of children.

At the right, Dr. Grosvenor and a Cambodian friend discuss one of a series of paintings that recreate the life of the ancient Khmers—temple-building ancestors of the boy. As they stand by Angkor Wat, the boy learns that the full story of the massive, intricately carved temple is to be told in the April, 1960, *National Geographic*.

Below, Japanese school kids smile through raindrops as they sight-see in Kyoto's famous Ninomaru Garden. "The rain only seemed to make it more fun for them," said the editor-photographer.

JAPANESE GIRLS in school blouses romp on the beach at Kamakura, on Japan's main island of Honshu. At Kyoto, Nippon's old capital (right), Dr. Grosvenor shared a joke with these children and caught their delight in this photograph.

HIP DEEP in his work, Editor Grosvenor and his shiny Leicas attract willing models in Hong Kong. These children live on junks in the harbor of the crowded British Crown Colony on the Chinese coast. From Red China come refugees at the rate of 10,000 a month. Travel by editors, writers, and photographers keeps the *National Geographic* timely, authoritative, and as fresh as the smiles on these children's faces.

UMI